

THE IMPACT OF ANTHROPOGENIC AND OCEANIC NUTRIENTS ON THE ECOSYSTEM OF THE SETO INLAND SEA

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The Seto Inland Sea, Japan, is a semi-enclosed sea connected to the shelf sea through two openings. Since 1960's, excessive nutrients by land-based activities have flown into the sea and caused red tide. Environmental management centering around controls on inputs from land has been conducted to improve this water quality declination. However, recent study revealed that natural nutrients also flow into the Seto Inland Sea from the shelf through two openings. To quantify the impact of land-based activities, estimation of the influence of both anthropogenic and natural nutrients on water quality and the ecosystem is necessary.

Detailed hydrographic observation was conducted in August 2002, to elucidate the processes of transport of nutrients from both sources and their influence on the ecosystem of the Seto Inland Sea. The results show that large nutrient pools are formed on the bottom of the central basin and on the lower layer of the two basins adjacent to the shelf. The former nutrient is generated by decomposition of land-derived matter, and the latter is supplied from the ocean. The nutrients in these pools are upwelled by strong tidal mixing in the straits and transported to the euphotic layer in the adjacent basins, and induce subsurface chlorophyll maximum layer. Thus, the geographical character of the Seto Inland Sea, namely the structure like a chain of tidally stirred straits and stagnant basins, plays an important role in transport of anthropogenic and natural nutrients, and those nutrients exert influences on the primary production, on which the ecosystem bases.